

CLAIMS

We claim:

1. A method of providing an in-mold coated molded article, comprising:
 - (a) injecting a molten resin into a mold cavity (16) until the molding cavity (16) is substantially filled;
 - (b) allowing the injected molten resin to cool in the molding cavity (16) to form a molded article; and
 - (c) injecting a coating composition into the molding cavity (16) and onto the molded article to coat the molded article when at least a surface to be coated of the molded article has reached a modulus sufficient to support said coating composition.
2. The method of claim 1 further comprising injecting said coating composition into the molding cavity (16) and onto the molded article at a predetermined elapsed time from the step of injecting the molten resin into the molding cavity (16) that corresponds with the surface of the molded article reaching a modulus sufficient to support said coating composition.
3. The method of any of claims 1 and 2 wherein said molding cavity (16) has a volume that remains substantially constant during steps (a) through (c) and is defined by mold members (12,14) that generally remain a substantially fixed distance relative to one another during steps (a) through (c).
4. The method of any of claims 2 and 3 further comprising:
 - providing a sensor between mold members (12,14) that define the mold cavity (16);
 - closing the mold members (12,14) to form the mold cavity (16) of a substantially fixed volume prior to the step of injecting the molten resin into the molding cavity (16);
 - actuating the sensor when the mold members (12,14) are closed;
 - initiating a timer when the sensor is actuated to measure elapsed time from the step of injecting the molten resin into the mold cavity (16); and
 - comparing the predetermined elapsed time against the measured elapsed time to determine when to inject said coating composition.

5. The method of any of claims 1 to 4 further comprising injecting said coating composition into the molding cavity (16) and onto the molded article before the article has cooled to the extent that curing of said coating composition is inhibited.

6. The method of any of claims 2 to 5 further comprising:
using closure of mold members (12,14) that define the molding cavity (16) to indicate that the step of injecting the molten resin into the molding cavity (16) has begun; and
injecting said coating composition at said predetermined time, said predetermined time being measured from closure of said mold members (12,14).

7. The method of any of claims 1 to 6 further comprising:
filling a metering cylinder (64) with a desired amount of said coating composition at a second elapsed predetermined time from the step of injecting the molten resin into the molding cavity (16) before the step of injecting said coating composition into the molding cavity (16); and
evacuating the desired amount of said coating composition from the metering cylinder (64) to inject said coating composition into the mold cavity (16) and onto the molded article at a predetermined elapsed time from the step of injecting the molten resin into the molding cavity (16) that corresponds with the surface of the molded article reaching a modulus sufficient to support said coating composition.

8. The method of claim 1 further comprising measuring pressure in the molding cavity (16) and injecting said coating composition into the mold cavity (16) and onto the molded article when a predetermined pressure is measured in the molding cavity (16) that corresponds with the surface of the molded article reaching a modulus sufficient to support said coating composition.

9. The method of claim 1 further comprising measuring temperature in the molding cavity (16) and injecting said coating composition into the molding cavity (16) and onto the molded article when a predetermined temperature is measured in the molding cavity (16) that corresponds with the surface of the molded article reaching a modulus sufficient to support said coating composition.

REPLACEMENT SHEET

-16-

10. An apparatus for injection molding and in-mold coating an article, said apparatus comprising:

at least two mold members (12,14) defining a mold cavity (16);

means (30) for injecting a molten resin into a mold cavity (16) to form a molded article therein;

means (32) for injecting a coating composition into the mold cavity (16) and onto the molded article; and

means for determining when at least a surface to be coated of the molded article has reached a modulus sufficient to support said coating composition.

11. The method of any one of claims 1-9 further comprising the step of recording data about said in-mold coated article including at least one of (i) the elapsed time from said step of injecting the molten resin into the molding cavity (16) until said coating composition is injected into the molding cavity (16), (ii) the pressure of the molding cavity (16) when said coating composition is initially injected into the molding cavity (16), and (iii) the temperature in the molding cavity (16) when said coating composition is initially injected into the molding cavity (16).

12. The method of claim 11 further comprising the step of transferring said recorded data to a remote location.

13. The method of any one of claims 1-9 and 11-12 further comprising the steps of:

using a package code reader for obtaining information on the in-mold coating composition from a container holding the in-mold coating composition; and

recording said obtained information on the in-mold coating composition.

REPLACEMENT SHEET

-16a-

14. The method of any one of claims 1-9 and 11-13 further comprising the steps of:

providing a user interface wherein a user is presented with a plurality of part icons corresponding to a plurality of in-mold coated articles; and

selecting a specific part icon from said plurality of part icons that corresponds to a specific one of said plurality of in-mold coated articles; and

presetting at least one in-mold coating parameter based on said selected part icons.

ART 19 AMDT